

unequal; actually they are alike in each stamen but those of the posterior stamens are smaller. However I am convinced that ours must be the plant of Rafinesque, and that such an error is due either to a lapse of memory in recording his observation or more likely to confusing in his dried specimen the sacs of two different stamens. This opinion is confirmed by Rafinesque's inclusion in his new genus of Michaux's plant. However for anything less than a certainty and for an untrue name it may be unwise to dispossess Bentham's well-chosen name.

Tomanthera auriculata (Michx.) Raf. l. c. 66. 1837.

Otophylla Michauxii Benth. in DC. Prod. 10: 512. 1846.

New name for *Gerardia auriculata* Michx.

Otophylla auriculata (Michx.) Small, Fl. S.E. Un. St. 1075, 1338. 1903.

Agalinis auriculata (Michx.) Blake in *Rhodora* 20: 71. 1918.

Aureolaria auriculata (Michx.) Farwell in Rep. Mich. Acad. Sci. 20: 189. 1918.

Flowering from late August to mid-September, fruiting September and October.

Old fields and railway banks, occasional in New Jersey and Pennsylvania. Certainly introduced from the prairies of the Mississippi Valley states.

(*To be concluded.*)

THE GRASSES OF SALEM, OREGON AND VICINITY

BY JAMES C. NELSON

The following list represents the result of five seasons' collecting in the general region adjacent to Salem. Although the work has been done in the all-too-brief moments that could be snatched from arduous professional duties, and makes no claim to completeness, the writer ventures to believe that most of the grasses growing spontaneously in the territory under consideration have been included. In the case of the introduced species, there is the constant possibility of the establishment of new

forms, which make themselves at home here with surprising facility.

The area covered includes the city of Salem and that part of the Willamette Valley in Marion and Polk Counties contiguous to the city, extending to the foothills of the Cascades on the east and those of the Coast Range on the west, and up to an elevation of perhaps 1,000 feet. The Santiam River may be regarded as the boundary to the south, and no collections have been made more than ten miles north of Salem. No attempt was made to reach the grasses of higher elevations. A number of mountain species would be added by a survey of the subalpine and alpine zones of the Cascades.

The Willamette Valley in this part of its course is in general a wide alluvial plain, lying not more than 200 feet above sea-level, with very slight undulations of surface. From the foothills on the east to those on the west the average width of the valley is about 25 miles. The greater part of the area is under intensive cultivation. Hops and grain were formerly the chief crops, but fruit-growing is rapidly becoming the leading industry.

Immediately south of Salem a range of hills, known on the west side of the Willamette as the Eola Hills, with a maximum elevation of about 1,100 feet, crosses the valley from southeast to northwest. This range seems to represent a very recent geologic upthrust, and the basaltic rocks which form its core are heavily charged with iron, giving to the soil a characteristic red tinge. The Willamette River seems to have originally made its way through these hills along the valley now followed by the Southern Pacific Railway from Jefferson to Salem, and later to have been diverted into the present channel, which has cut a deep gorge through the hills north of Independence. The soil along this old riverbed is made up of stratified boulders and gravel, with a comparatively small admixture of sand and loam. In other parts of the valley there is a subsoil of tough yellow clay overlaid by a rich friable loam, in many places beginning to show exhaustion after seventy years of continuous cultivation. Numerous small streams traverse the area, Mill Creek being the most considerable. These are fringed with a heavy growth

of ash, dogwood, alder, willow, and other low shrubs. On the lighter gravelly soils, *Quercus Garryana* is the prevailing tree. Many fine groves of the "Douglas fir" (*Pseudotsuga taxifolia*) still exist in the level areas, and cover the steeper slopes of the foothills.

The climate is more oceanic than continental in character. There are two sharply contrasted seasonal periods. During the autumn, winter and spring months, the rainfall is heavy, sometimes as much as 14 inches in a single month, with a minimum winter temperature of not below 20 degrees Fahrenheit. The summer on the other hand is almost rainless, and temperatures of 100 degrees are not unknown. During the long dry season the porous soil becomes thoroughly desiccated, and all herbaceous vegetation not under cultivation, with the exception of a few drought-resisting plants and those along the streams, is dried up. On the setting in of the fall rains, however, the vegetation speedily revives, and continues green and luxuriant during the mild winter, reaching its maximum development in May and June. These conditions make it very difficult for any of the introduced pasture-grasses to survive the summer; and while a few of the native species seem better adapted to the arid environment, little attention has hitherto been given them.

No comprehensive attempt to catalogue the grasses of this region seems to have been made. This will be evident from the number of species included in the following list which have not found mention in any of the published manuals dealing with the flora of Western Oregon. These species are marked "X." Introduced species are designated by an asterisk (*). The nomenclature conforms to that used in A. S. Hitchcock's treatment of the Gramineae in Jepson's *Flora of California* (1: 82-189. 1912). The writer is under obligation to Professor Hitchcock and Mrs. Agnes Chase for their kindness in examining and verifying practically all of his specimens. Professor C. V. Piper has kindly placed the results of his long and careful study of the flora of the Northwest at my disposal; and Professor M. E. Peck of Willamette University, who is probably more thoroughly conversant with the flora of Oregon than any other Western

botanist, has very generously contributed the results of his own collection and study. Specimens of practically all these grasses may be found in the herbarium of Willamette University at Salem, and many of them have also been deposited in the Gray and the National Herbaria.

1. **Digitaria humifusa* Pers. Not uncommon on sand-bars along the Willamette River, and beginning to appear on lawns about Salem (X).
2. **Echinochloa crus-galli* (L.) Beauv. Not infrequent along ditches and in low ground, and occasional in cultivated fields.
3. **Setaria viridis* (L.) Beauv. An occasional specimen is found in cultivated ground and along railroad tracks, but it is still to be regarded as a stray in this district.
4. *Paspalum distichum* L. Common on muddy and sandy shores of the Willamette about Salem, and apparently indigenous, although far out of its ordinary range.
5. *Panicum barbipulvinatum* Nash. Common on river-shores, and occasional in sandy fields. Formerly referred to *P. capillare* L., with which it seems to intergrade.
6. *Panicum Scribnerianum* Nash. Not infrequent in dry soil, especially where sand or gravel predominates.
7. *Panicum pacificum* Hitchc. & Chase. On gravelly prairies about Salem, and more frequent toward the mountains.
8. **Panicum miliaceum* L. An occasional waif on rubbish-heaps about Salem (X).
9. *Leersia oryzoides* (L.) Sw. Along slow streams and on muddy rivershores, sometimes forming extensive colonies.
10. **Phalaris arundinacea* L. Occasional in waste places about Salem. The var. *picta* L. is not uncommon in cultivation.
11. **Phalaris canariensis* L. A waif on rubbish-heaps about the State Prison, Salem.
12. **Anthoxanthum odoratum* L. Not infrequent in pastures and on lawns, appearing very early in spring.
13. **Anthoxanthum Puelii* Lecoq & Lamotte. Occasionally found in dry alkaline soil along the road-side. It has probably been taken for the preceding (X).

14. *Hierochloe macrophylla* Thurb. In rich woods in the foothills both of the Cascades and the Coast Range.
15. *Stipa Lemmoni* (Vasey) Scribn. On dry rocky hillsides on the Eola Hills in Polk County, where it is locally abundant.
16. * *Phleum pratense* L. Occasionally cultivated, and frequently running wild along roadsides and borders of fields.
17. * *Polypogon monspeliensis* (L.) Desf. In ditches and low ground especially in alkaline soil. Not common.
18. *Alopecurus aristulatus* Michx. Very common in wet places and borders of ponds. The nomenclature of this species is much confused.
19. * *Alopecurus pratensis* L. Found only in one station, along the S. P. tracks about a mile south of Salem, where it is well established.
20. * *Aristida oligantha* Michx. In dry sandy soil and on sand-bars along the Willamette, evidently a recent introduction from the south (X).
21. * *Apera spica-venti* (L.) Beauv. A single specimen was found on a lawn of *Poa pratensis* in Salem (X).
22. * *Agrostis alba* L. Very common along roadsides and in pastures. The form known as "creeping bent" (*A. stolonifera* auth. not L.) is common on lawns in Salem.
23. *Agrostis Hallii* Vasey. Not infrequent on dry banks and borders of woods.
24. *Agrostis foliosa* Vasey. A grass of the seashore and mountains, but following the Santiam River down to an elevation of over not 600 feet.
25. *Agrostis microphylla* Steud. Very common in ditches and low ground, and extremely variable.
26. *Agrostis hyemalis* (Walt.) BSP. Rarely found outside of mountain districts, but occasional along streams at low altitudes.
27. *Agrostis oregonensis* Vasey. In marshes in the old bed of Lake Labish, east of Brooks.
28. * *Notholcus lanatus* (L.) Nash. Abundantly cultivated throughout our range, although of comparatively little value, and escaping freely to fields and roadsides.

29. * *Arrhenatherum elatius* (L.) Beauv. Common in dry fields and on roadsides, and spreading rapidly.
30. * *Aira caryophyllea* L. Abundant everywhere in dry or rocky sterile soil.
31. * *Aira praecox* L. Common in a tract of waste ground east of the S. P. station at Salem, but not observed elsewhere.
32. * *Aira capillaris* Host. On sandbars in the North Santiam River at North Santiam Station, and also in flower-beds on the campus of Willamette University at Salem (X).
33. *Danthonia californica* Boland. In open meadows, scarce in our limits, but becoming more common southward.
34. *Danthonia americana* Scribn. Very common in dry meadows.
35. * *Avena fatua* L. Introduced along railroad-tracks and in waste places (X).
36. * *Avena fatua* L. var. *glabrata* Peterm. With the last, but more common.
37. * *Avena barbata* Brot. Frequent along the S. P. tracks south of Salem—probably a recent introduction (X).
38. * *Avena sativa* L. A very common escape along railroad tracks and in waste places.
39. *Deschampsia caespitosa* (L.) Beauv. A very handsome and variable grass, common in low ground, especially in roadside ditches.
40. *Deschampsia danthonioides* (Trin.) Munro. Common on sand-bars and in dried-up pools along roadsides.
41. *Deschampsia elongata* (Hook.) Munro. Common on the borders of woods and in roadside ditches.
42. *Trisetum cernuum* Trin. Infrequent in low woods.
43. *Trisetum canescens* Buckl. Occasional in dry open woodlands.
44. * *Gynerium argenteum* Nees. Although this shows no disposition to spread, it has persisted for years in vacant lots where dwellings once stood (X).
45. *Eragrostis hypnoides* (Lam.) BSP. Very common on muddy shores of the Willamette River.
46. * *Cynosurus cristatus* L. Occasional on lawns and street-parking about Salem.

47. * *Koeleria cristata* (L.) Pers. Rather scarce in dry gravelly soil.
48. *Pleuropogon refractus* (Gray) Benth. Along streams in moist woods in the foothills, not common.
49. *Melica subulata* (Griseb.) Scribn. In open rocky woods, common. Flowers very early.
50. *Melica Geyeri* Munro. Occasional on roadsides near Salem—probably its extreme northern extension (X).
51. * *Briza minor* L. Well established in the State Fair Grounds at Salem. Probably introduced from Southern Oregon, where it is very common (X).
52. *Bromus carinatus* Hook. & Arn. Very common in dry soil everywhere, and probably often confused with the next.
53. *Bromus marginatus* Nees. In dry open places, especially near dwellings, very common.
54. *Bromus polyanthus* Scribn. In waste-places and on street-parkings about Salem, appearing as if introduced (X).
55. *Bromus vulgaris* (Hook.) Shear. Common in dry open woods. A difficult species, very variously understood by Western authors.
56. *Bromus vulgaris* (Hook.) Shear var. *eximius* Shear. With the last, but less frequent.
57. * *Bromus tectorum* L. Becoming common along railroad-tracks and in waste places (X).
58. * *Bromus tectorum* L. var. *nudus* Klett & Richter. With the last, but much less common.
59. * *Bromus villosus* Forsk. Becoming very common along the railroads and in waste places, and threatening to become a serious menace if not checked.
60. * *Bromus rubens* L. An occasional specimen is found along railroad tracks.
61. * *Bromus sterilis* L. Very common in dry sterile soil.
62. * *Bromus hordeaceus* L. Perhaps our most common grass—abundant in dry soil everywhere, and very variable.
63. * *Bromus hordeaceus* L. var. *leptostachys* Beck. In similar situations with the last, but not so common.
64. * *Bromus secalinus* L. Not uncommon in grain-fields, and occasionally cultivated.

65. * *Dactylis glomerata* L. A very common escape to fields and roadsides.
66. * *Poa annua* L. Extremely common along waysides, in cultivated fields and in lawns. Flowers almost continuously throughout the year.
67. * *Poa compressa* L. Not infrequent in sandy soil, along the Willamette.
68. * *Poa pratensis* L. Our commonest lawn-grass, and escaped to meadows and pastures everywhere.
69. *Poa nervosa* (Hook.) Vasey. A mountain species that has been found in our limits only at Silver Creek Falls in the Cascades, on moist rocky banks.
70. * *Poa trivialis* L. Not infrequent in damp shady places.
71. *Poa triflora* Gilib. Common along streams in low ground.
72. *Poa leptocoma* Trin. In damp thickets at Silver Creek Falls.
73. *Poa scabrella* (Thurb.) Benth. Not infrequent in dry gravelly soil about Salem (X).
74. *Poa Howellii* Vasey & Scribn. Not uncommon in dry coniferous woods.
75. *Poa multinomae* Piper. A grass of the Columbia Gorge, but collected on rocks in the bed of Silver Creek, one mile above Silverton (X).
76. *Festuca octoflora* Walt. Rather scarce in dry open places near the Willamette.
77. *Festuca megalura* Nutt. Very abundant in dry soil along roads and in waste places everywhere, appearing as if introduced.
78. * *Festuca myuros* L. Has been found only at one station, on railroad tracks at West Salem, Polk County.
79. * *Festuca bromoides* L. Occasional along roadsides and railroad tracks.
80. *Festuca californica* Vasey. On dry hillsides at Eola, Polk County, not observed elsewhere.
81. * *Festuca rubra* L. Occasional on lawns about Salem, where plainly introduced; but the form on gravelly prairies appears to be native.

82. * *Festuca rubra* L. var. *megastachys* Gaudin. Occasional along railroad tracks (X).
83. *Festuca occidentalis* Hook. Not uncommon in dry open woods.
84. * *Festuca elatior* L. Common on roadsides and borders of fields.
85. *Festuca subulata* Trin. In open thickets and borders of woods. A species of very rapid growth, often reaching a height of 5-6 feet after the first warm days of spring.
86. *Festuca idahoensis* Elmer. Occasional in dry gravelly soil (X).
87. * *Scleropoa rigida* Griseb. Around old buildings in the business district of Salem (X).
88. *Phragmites communis* Trin. In swampy soil in the old bed of Lake Labish, two miles east of Brooks (X).
89. *Glyceria leptostachya* Buckl. Borders of ponds and slow streams, not common.
90. ***Glyceria occidentalis*** (Piper) comb. nov. First described as *Panicularia occidentalis* in Piper & Beattie, Fl. N. W. Coast 59 (1915). It was originally collected by Hall in the vicinity of Salem, where it is not infrequent along wet ditches. Easily distinguished from *G. leptostachya* by the acutish lemmas. So far as I know it has not yet been transferred to *Glyceria*, and the combination is accordingly proposed.
91. *Glyceria pauciflora* Presl. Common along streams and in wet places.
92. *Glyceria grandis* Wats. With the last, but less common.
93. *Beckmannia erucaeformis* (L.) Host. In ditches and wet meadows, not common.
94. * *Lolium temulentum* L. Rather scarce, but occasionally too abundant in grain fields.
95. * *Lolium multiflorum* Lam. Abundant in dry soil almost everywhere. Apparently long confused with the next. The species is very subject to teratological variations. An apparent hybrid with *Festuca elatior* has been collected.
96. * *Lolium perenne* L. With the last, but less common.

97. * *Lolium perenne* L. var. *cristatum* Doell. A single specimen was collected in a wooded ravine near Eola, Polk County, at considerable distance from any dwelling or cultivated ground.
98. *Agropyron tenerum* Vasey. Not uncommon in dry soil in meadows and grain-fields.
99. * *Agropyron repens* (L.) Beauv. Beginning to appear in gardens and fields, and threatening to become a serious nuisance.
100. *Elymus glaucus* Buckl. Very common in dry soil, and extremely variable.
101. * *Triticum vulgare* L. A common escape along railroads and in waste places. Both the bearded and beardless forms occur. It does not seem worth while to maintain Host's *T. compactum* for the Western "soft" wheat (X).
102. * *Hordeum murinum* L. Very common in waste places.
103. * *Hordeum Gussoneanum* Parl. Common, especially in dried mud along roadsides.
104. * *Hordeum jubatum* L. Only a few isolated specimens have been found in waste places.
105. * *Hordeum nodosum* L. Common along ditches and on banks of streams.
106. *Sitanion jubatum* J. G. Smith. Occasional on dry gravelly prairies about Salem (X).

In addition to the cereals mentioned in the above list, *Zea mays* L. is a common field crop. An occasional farmer attempts the cultivation of "Sudan-grass" (*Andropogon Sorghum* (L.) Brot. subsp. *sudanensis* Piper). *Miscanthus sinensis* Anderss. is sometimes cultivated for ornament. A beautiful hardy Japanese bamboo of the genus *Phyllostachys* is a favorite among the local landscape-gardeners, but has never flowered.

It will be observed that of the 106 species and varieties listed above, 55, or over half the entire number, are introduced, and 51 native; and while the latter number may be regarded as fairly constant, the former may be expected to show a steady increase*

* This finds further illustration in the fact that since writing the above *Digitaria sanguinalis* (L.) Scop. and *Setaria glauca* (L.) Beauv. have both appeared sporadically in Salem.

Nothing is more striking to the casual observer than the vast predominance of introduced *individuals* in the more densely settled areas. Often the native species have been entirely crowded out, and the grass-population over large sections is made up exclusively of immigrants, among which the genera *Bromus* and *Lolium* will show the greatest number of individual representatives.

The following attempt to group our grass-species ecologically is far from being exhaustive, but may serve to throw a little more light on the general phenomena of distribution. The following associations may be distinguished:

1. Riparian society, growing on the sand-bars and islands in the Willamette and Santiam Rivers, and along their muddy or gravelly shores, often in very dry soil: *Digitaria humifusa*, *Paspalum distichum*, *Panicum barbipulvinatum*, *Aristida oligantha*, *Agrostis foliosa*, *Aira capillaris*, *Eragrostis hypnoides*, *Poa compressa*, *Festuca octoflora*.

2. Hydrophyte society, growing only in water or wet ground along streams, borders of ponds &c.: *Leersia oryzoides*, *Alopecurus aristulatus*, *Agrostis microphylla*, *A. oregonensis*, *Deschampsia caespitosa*, *Poa triflora*, *Phragmites communis*, *Glyceria leptostachya*, *G. occidentalis*, *G. pauciflora*, *G. grandis*, *Beckmannia erucaeformis*.

3. Xerophyte society, found usually only in dry soil, especially on the gravelly prairies: *Panicum Scribnerianum*, *P. pacificum*, *Stipa Lemmoni*, *Aira caryophylla*, *Danthonia americana*, *Koeleria cristata*, *Bromus sterilis*, *Poa scabrella*, *Festuca megalura*, *F. rubra*, *F. idahoensis*, *Agropyron tenerum*, *Elymus glaucus*, *Sitanion jubatum*.

4. Silvicole society, generally occurring only in or at the borders of open woods: *Trisetum cernuum*, *T. canescens*, *Melica subulata*, *Bromus vulgaris*, *B. vulgaris* var. *eximius*, *Poa Howellii*, *Festuca occidentalis*, *F. subulata*.

5. Submontane society, restricted to the wooded lower slopes of the mountains, and not extending out into the valley: *Hierochloa macrophylla*, *Agrostis hyemalis*, *Pleuropogon refractus*, *Poa nervosa*, *P. leptocoma*.

6. Ruderal society, most abundant in waste places, and often associated with cultivated plants: *Echinochloa crus-galli*, *Arthoxanthum odoratum*, *Phleum pratense*, *Agrostis alba*, *Notholcus lanatus*, *Arrhenatherum elatius*, *Avena fatua*, *A. sativa*, *Bromus carinatus*, *B. marginatus*, *B. tectorum*, *B. villosus*, *B. hordeaceus*, *B. secalinus*, *Dactylis glomerata*, *Poa annua*, *P. pratensis*, *P. trivialis*, *Festuca elatior*, *Lolium temulentum*, *L. multiflorum*, *L. perenne*, *Triticum vulgare*, *Hordeum murinum*. Most of the others are either casual and sporadic, or occur indiscriminately in more than one of the above associations.

SALEM, OREGON.

NOTES ON COELOGYNE

BY T. D. A. COCKERELL

Coelogyne is a remarkable genus of palaeotropical orchids, with over a hundred species, distributed from India to the New Hebrides. The type species, *C. cristata* Lindley, comes from the base of the Himalayas, and has beautiful white flowers, the lip marked with orange. The most remarkable thing about the genus is, perhaps, that the lip in some of the species is marked with black. I have before me a number of fresh flowers of *C. pandurata* Lindley, from Borneo. The profuse marking of the pale greenish lip is dull black, with a very faint rusty tint. The small concavity at the extreme base is cinnamon-brown. The other petals, and the long sepals, are pale yellowish green. The column or gynostemium is suffused with apple green, especially at the tip. The bright orange pollinia rest on a broad crenulate or subfimbriate base. The lip is described by Nash* as 2-keeled, but Pfitzer and Kränzlin† treat it as 3-keeled in their key. There is actually a well-developed median keel, but it is smaller than the others. Costantin‡ gives a colored figure of *C. pandurata*, but unfortunately it is colored bright bluish-green, whereas the color should be like that of *Trias oblonga* on the same plate.

* Standard Cyclop. Horticulture.

† Das Pflanzenreich, 1907.

‡ Atlas des Orchidées Cultivées, pl. 25, f. 1.